

PREFACE

This guidebook was developed following U.S. EPA Region 5 emergency responses to the Springfield Mercury site in 1997 (16 mercury-contaminated residential homes), the Mulberry Street Mercury site in 2000 (6 mercury-contaminated residential homes), and the Newport Mercury House site in 2000 (1 mercury-contaminated home). The sections in this guidebook are based on lessons learned and are not necessarily U.S. EPA Region 5 policy.

In general, a mercury response should follow the six “R’s” of a residential response as outlined in this guidebook:

1. Referral
2. Reconnaissance
3. Relocation (Temporary)
4. Removal
5. Replacement
6. Reoccupation

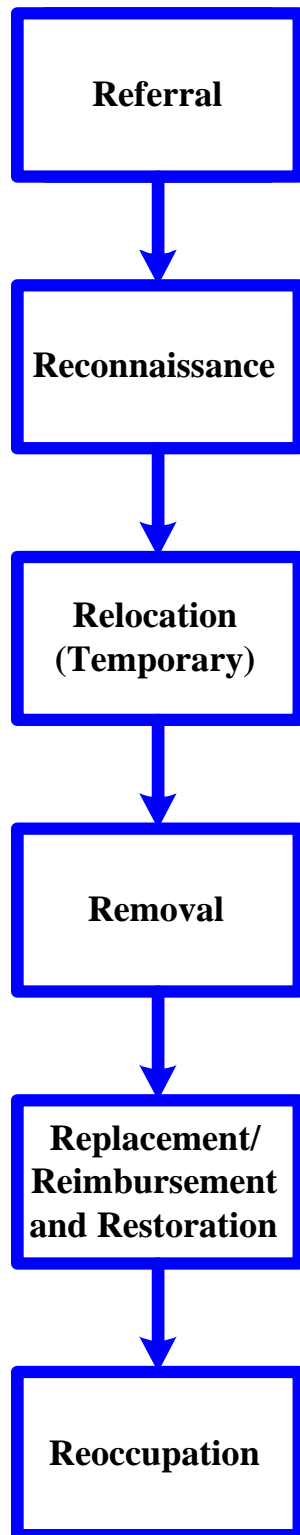
The six “R’s” of residential response have evolved from the large-scale methyl parathion cleanups in Lorain County, Ohio in 1995 and 1996, and are now applied to time-critical mercury responses.

Note: The six “R’s” of residential response is a registered copyright of U.S. EPA Region 5 Response Section 1.

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The Six “R’s” of a Residential Mercury Response



1.0 General Information

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1.1 General Information

Elemental mercury is a hazardous metal that can cause serious health problems. Elemental mercury vapors can affect many different areas of the brain, the nervous system, and their associated functions. Children and fetuses are most vulnerable to the serious health effects of mercury. The Agency for Toxic Substances and Disease Registry (ATSDR) and the U.S. Environmental Protection Agency (U.S. EPA) jointly issued an alert to the general public warning of the health dangers associated with mercury exposure.

Elemental mercury is a shiny, silver-white, odorless liquid that is used in thermometers and other medical and industrial instruments, electrical switches, batteries, and dental fillings. It is also used industrially to produce chlorine gas and caustic soda. Elemental mercury is used, to some extent, in herbal and religious remedies associated within certain spiritual practices and folk remedies in Latin American, Caribbean, and Asian cultures. Elemental mercury spills in homes and schools are of particular concern because a relatively small amount at room temperature in an enclosed space can evaporate and result in dangerous levels of mercury vapor.

The Region 5 Superfund Emergency Response Branch has responded to numerous mercury releases involving schools and private residences. In many of these incidents, children obtained unsecured mercury and contaminated schools, their own residences, and the residences of others.

1.2 Human Health Effects

Adverse human health effects can result from acute or chronic exposure to mercury. Exposure occurs primarily through inhalation, and to a lesser extent through skin absorption or ingestion. Acute exposure to high levels of elemental mercury vapor can affect the brain and the central nervous system. Exposure to high levels of mercury vapor can also cause symptoms such as irritation to the lining of the mouth, lungs, and airways; increased blood pressure and heart rate; nausea; vomiting; diarrhea; skin rashes; eye irritation; and a condition known as acrodynia. Acrodynia is a syndrome characterized by red peeling skin, especially on the hands, feet, and nose. Exposure may also include symptoms such as weakness, fretfulness, sleeplessness, excessive salivation or sweating, itching, swelling, fever, memory loss, and elevated blood pressure.

Even a small amount of mercury remaining in a room after a spill can continue to evaporate slowly over time, resulting in elevated concentrations of mercury in the air, thus presenting the threat of chronic exposure. Symptoms of chronic exposure to elemental mercury include personality changes (irritability, shyness, nervousness), tremors, vision changes, deafness, lack of muscle coordination, loss of sensation, and memory difficulties.

Mercury exposure to pregnant women is of particular concern because mercury readily passes

from the placenta to the fetus and can accumulate in higher concentrations in the unborn baby. Young children also are susceptible to the effects of mercury because it affects the central nervous system, which is still developing in the first few years of life. Even low levels of mercury exposure have been associated with learning problems in children.

Mercury absorbed through the lungs, gastrointestinal tract, or the skin can accumulate in the brain and kidney, and is slowly excreted from the body. Because mercury can accumulate in the kidneys, the kidneys are particularly sensitive to damage. Exposure to mercury can be verified by testing blood, urine, or hair samples. Individuals who have elevated levels of mercury in their body can be treated with “chelating agents” to increase the rate of excretion of mercury from the body (U.S. Department of Health and Human Services, ATSDR, Toxicological Profile for Mercury, Update, March 1999).

Attachment A contains more information regarding the health effects of mercury. **Attachment B** contains the “Guidelines for Responding to Mercury Spills and Releases in Schools and Residences.” **Attachment C** contains a U.S. EPA Region 5 letter to the State Environmental Programs and State Health Departments outlining U.S. EPA’s role in small (minimal spread), small (dispersed), and large quantity mercury spills. The matrix chart identifies the point at which U.S. EPA will respond to a mercury spill incident.

1.3 U.S. EPA Contact Numbers - Enforcement Team

The following is U.S. EPA’s enforcement team for all mercury sites:

- Carol Ropski, Enforcement Specialist (312) 353-7647
- Hedi Bogda - Cleveland, OH, Regional Counsel (312) 886-5825
- Tom Krueger, Regional Counsel (utility companies only) (312) 886-0562